CHAPTER 6.
SAFETY

Section 1. ACCIDENT CAUSES AND SAFETY MEASURES

6-1. General.

The greatest single cause of accidents on military installation trackage is insufficient clearance for moving railroad cars and/or personnel. In many cases, minimum clearance limits are violated by building additions, stacked materials, parked vehicles, and protruding piping or wiring attached to platforms and walls. Other prominent accident causes are unsafe equipment, unstable loads, tripping hazards, lack of illumination, lack of warning devices, restricted visibility, and unauthorized crossings. Just plain carelessness is another cause of accident around the tracks and railroad cars. Hazards shall be classified by degree as required by Military Standard 822-A, System Safety Program Requirements as described in paragraphs 7-8.1 through 7-8.3.4.

6-2. Fixed Structures.

Fixed structures that impair safe clearance are listed below in the general order of prevalent hazards.

6-2.1. Platforms. Floors and elevated platforms in excess of 3 feet 9 inches in height must be a minimum of 6 feet 2 inches from the center of the track (Figure 6-1). This clearance is often lost for several reasons. Old, wood platforms may sag and lean toward the track, or timbers may become loose and bend outward from the platform. In strengthening platforms, timber should not be scabbed on to overlap the existing timbers that have deteriorated or become weakened, or other construction added that extends the platform trackwise. A reduction of the 6-foot 2-inch clearance, even by several inches, could result in an injury to a riding trainman or, if the obstruction protrudes far enough, it could strike and damage the stirrups and grab irons on the cars.

6-2.2. Retaining Walls. Retaining walls must also have a minimum clearance of 8 feet 6 inches (Figure 6-1). This minimum clearance may be lost by the wall creeping or bulging from pressures on the other side.

6-2.3. Pipes and Wires. Utilities services should not be attached to existing platforms and buildings or retaining walls having proper clearance. The pipes, cables, and wiring affixed to brackets or fasteners that protrude from the surface to which they are attached reduce the clearance, sometimes to an unacceptable degree.

6-2.4. Buildings. Additions to existing buildings should not encroach upon the minimum clearance (8 feet 6 inches), or windows, shutters, or doors that swing outward should not be installed. The latter are particularly dangerous because they often are not noticed or may be opened as a train is passing by. It is important that structural plans as well as plans for installing outside piping and wiring be approved to assure that such hazards are not created. Window-type air conditioners should not be installed in buildings within the clearance zone, as they often protrude significantly into the area involved. Canopies and other overhanging elements must be high enough to clear locomotives and cars (Figure 6-1).

6-2.5. Gates. At many installations, trackage may pass through boundary perimeter and/or security fences. Gates should be securely fastened in open position to prevent them from swinging toward the moving train, striking the locomotive and/or cars or a riding trainman.

6-2.6. Overhead Structures. Pipe trestles, bridges, elevator bins, chutes, and other overhead structures must meet the clearance criteria on Figure 6-1. Equipment used to load or unload cars must be raised to a safe clearance prior to train movements. Suitable devices must be installed to keep this equipment in a raised position at this safe clearance not in use.

6-3. Safe Clearance Limits.

6-3.1. Parked Vehicles. Areas adjacent to railroad trackage on military installations are sometimes used for vehicle parking. Suitable bumpers or rail guards will be installed to prevent personnel from parking vehicles inside the safe clearance limit. In the loading areas, hand trucks, fork lifts, and other materials handling equipment must not be left carelessly at less than safe distances from the track.

6-3.2. Trucks. Trucks often load directly into or unload directly from the railroad cars. They must be

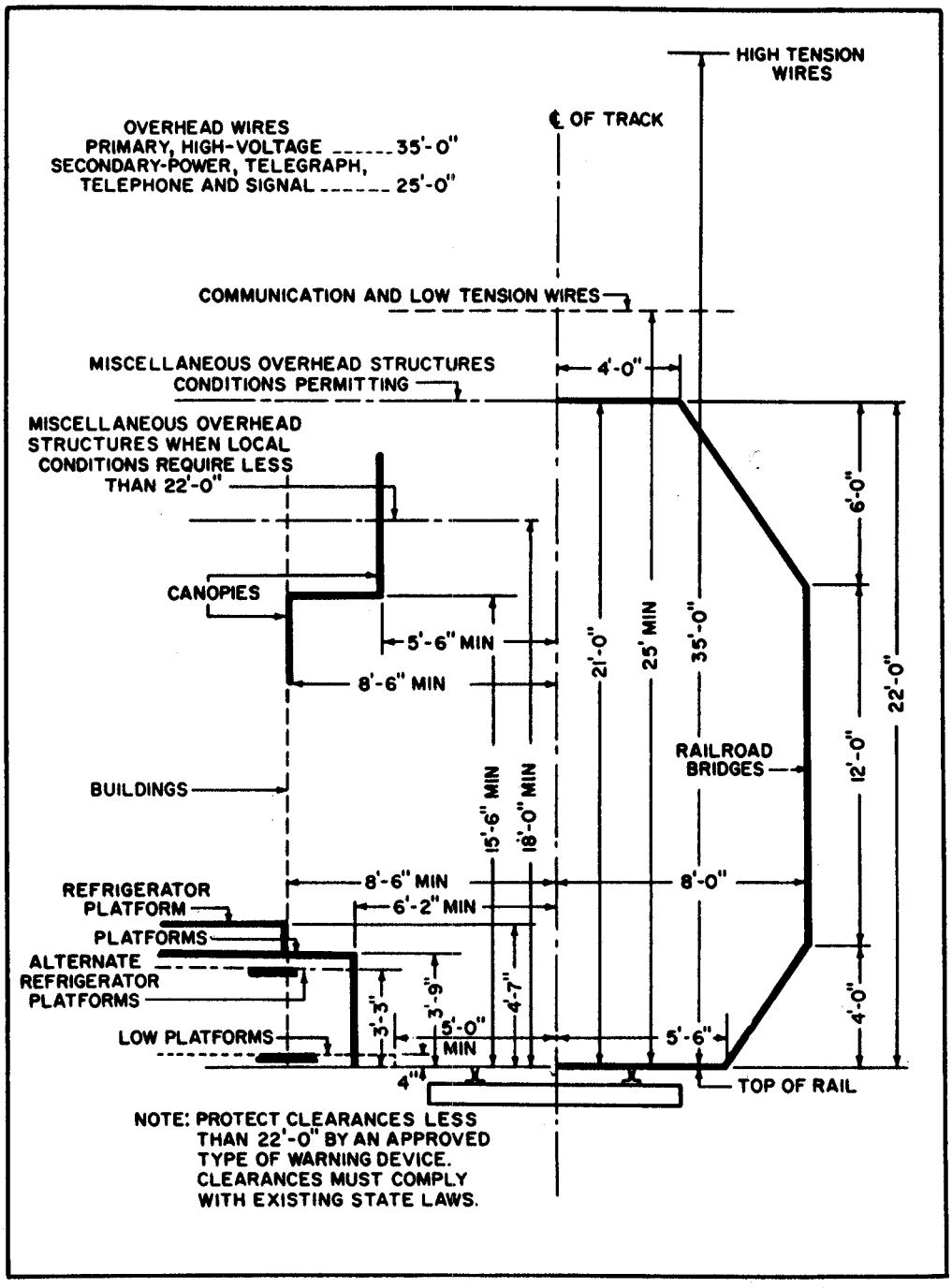

Figure 6-1. Minimum safe clearances.

moved at least 8 feet from the centerline of the track before moving the railroad cars. Trucks at loading docks in restricted areas must park so that neither the truck tractor nor the trailer encroaches on the safe clearance limits.

6-3.3. Stored Materials. Materials are often stored adjacent to railroad tracks. Palleted or stacked material must clear the track area by not less than 8 feet from the track centerline. Loose material such as sand, gravel, coal, etc., must be stored in bins or at least in an area that is barricaded on the trackward side. Coils of cable must be placed or blocked so that they cannot roll toward the track. Drums must be placed and stacked so that they will not tumble or roll toward the track. The 8-foot clearance criterion applies to short- or long-time stored materials. Flammable or explosive materials must be stored at clearances specified by the activity safety engineer, fire marshal, or ordnance officer.

6-3.4. Curves. The clearances shown in Figure 6-1 may have to be increased in the areas of switches and curves. The sharpness of the curve and the overhang of the longest cars brought into the installation will determine the increase in clearance required. The clearances shown are for tangent track and new construction. Clearances for reconstruction work or for alteration depend on existing physical conditions and, where reasonably possible, should be improved to meet the requirements for new construction. On curved track, the lateral clearances shall be increased 1 inch per degree of curvature, with a maximum increase of 18 inches. When the fixed obstruction is on tangent track but the track is curved within 80 feet of the obstruction, the lateral clearances shall be increased as follows:

Distances from Obstruction to Curved Track ft	Increase per Degree of Curvature in.
0-20	1
21-40	3/4
41-60	1/2
61-80	1/4

6-4. Other Obstacles or Hazards.

6-4.1. Track Condition. Track conditions such as broken rails, broken rail joints, rotten ties, loose spikes, and maladjusted switches can cause derailment. Procedures for correcting these conditions are outlined in Chapters 3 and 4.

6-4.2. Drainage. Lack of adequate drainage can cause a softening of the roadbed. This can lead to track settlement, which in turn can result in broken rail joints or loose spikes. Shoulder erosion creates hazardous footing, which may result in missteps or falling. Procedures for correcting drainage deficiencies are outlined in Chapter 4, Section 3, and Chapter 5, Section 2.

6-4.3. Housekeeping. Tools, track hardware, ties, rails, spillage from hopper cars (coal, gravel, etc.), trash, and refuse left along the track are serious hazards.

6-4.4. Excavations. Open trenches are hazards. Excavated earth and stone from these trenches, if left on the shoulder or at an inadequate distance from the track, add to the danger. Trenches must be marked clearly or covered with planks or gratings when work is not being done. Excavation must also be adequately shored to prevent collapsing and shifting or settling of the roadbed. Permanent pits, trenches, and other openings under or around the track must have flush-fitting gratings or covers, which will be kept in place at all times, when not in use.

6-4.5. Accessories and Devices. Accessories such as lamps, rerailers, and derailers must be kept in good working condition. Lamps or lights must be lit during periods of poor visibility. Crossing signals and gates, switch stands, interlocking devices, etc., must be maintained in serviceable condition to prevent accidents. Bumpers or wheel chocks must be maintained in operable condition. Only experienced personnel shall be involved in the use of rerailers.

6-4.6. Safety Operations. Any operation in which cars are moved must be accomplished with safety in mind. Maintenance personnel must stay clear of cars being pulled or poled, coupled or uncoupled, or rerailed. To minimize potential accidents, only authorized personnel will ride cars. Blind corners caused by buildings, walls, etc., must be protected by railings or barricades. Personnel should give standing cars a clear berth and must wait for a passing train to move a sufficient distance to enable them to observe the adjacent track for other train movements before proceeding across the tracks. Temporary or nonstandard road crossings shall be properly posted. Figure 6-2 is an example of good housekeeping and safety practices.

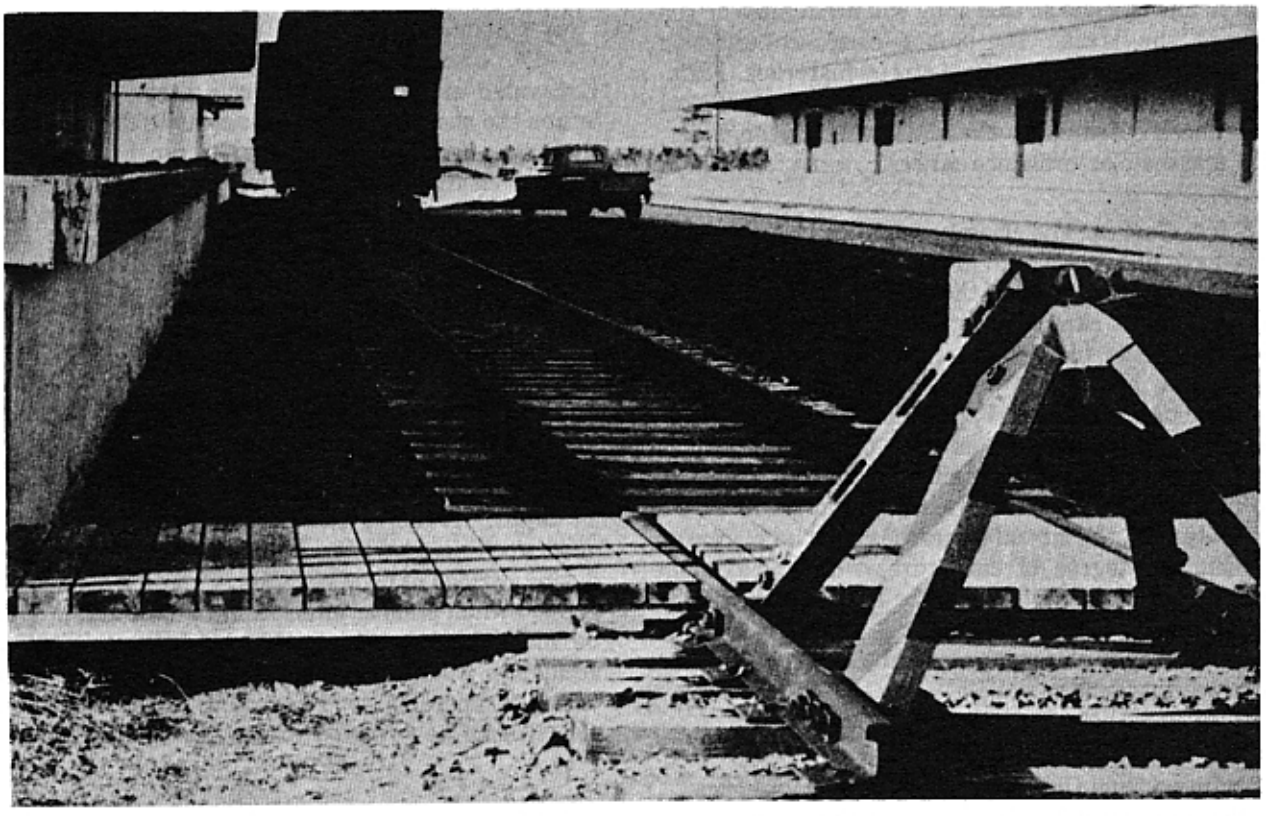

Figure 6–2. Good housekeeping and safety practice.

Section 2. SAFETY PRECAUTIONS

6-5. Procedures.

In addition to guidance concerning hazards given in the foregoing paragraphs, the following procedures must be carried out to assure maximum safety in railroad operations and maintenance.

6-5.1. Inspection. The safety inspections shall be made as directed by the installation Safety Engineer, but not less than once annually in conjunction with maintenance inspections as outlined in Chapter 7.

6-5.2. Safety Inspection Checklist. The following checklist must be used by safety inspectors, and a copy of their report shall be furnished to the installation Safety Engineer and the installation office responsible for maintenance of trackage (Chapter 1).

6-5.2.1. Clearances measured from the centerline of the track to all fixed structures. Clearances not meeting the criteria of Figure 6-1 must be reported.

6-5.2.2. Openings in all structures that have doors, windows, etc., opening out into the clearance limit.

6-5.2.3. Fixtures, pipelines, and other utilities erected or installed inside the clearance limits.

6-5.2.4. Missing or inoperative warning devices or signs. Condition of and/or obstructions of signs.

6-5.2.5. Gates that cannot be securely held open.

6-5.2.6. Unsafe condition of track shoulders or trackbed such as erosion, open ditches, trenches, or pits. Broken, loose, or missing gratings or covers.

6-5.2.7. Improperly working switches and derailers. Loss of or improper marking of clearance points.

6-5.2.8. Improper use of wheel chocks, unsafe car stationing (without set brakes or wheel chocks on grades), loose chocks and bumpers, and condition of cattle guards.

6-5.2.9. Condition of cranes, chutes, and loading or unloading devices that might affect the safe clearance criteria. This applies to all overhead structures.

6-5.2.10. Parking areas and trucks or other equipment encroaching on the clearance limits.

6-5.2.11. Materials stored an inadequate distance from track or projecting into the clearance limits from storage areas or loading docks.

6-5.2.12. Condition of rails, joints, and ties that may create a hazard.

6-5.2.13. There shall be no missing, loose, broken components, bad welds, accumulation of debris, heavy corrosion, or severe deterioration of the following trackage appurtenance: (1) ladders, platforms, and hand rails; (2) rail stops; (3) guardrails and fences; (4) crossing signs and other warning signs; and (5) any other features that could cause an accident.

6-6. Maintenance Inspectors and Track Crews.

Maintenance inspectors and/or track crews are responsible for reporting obstructions or hazards along the tracks such as trash, loose hardware, and any other objects that foul the safe clearance limits. Maintenance personnel shall remove or clean up such obstacles as they go along. More detailed responsibilities of these personnel are provided in Chapter 7.

Section 3. SAFETY WARNINGS AND SIGNS

6-7. Installation of Warnings and Signs.

When hazards exist because of inadequate clearances, construction work, blind corners or approaches, proximity of flammable or explosive storage, heavy vehicle or pedestrian traffic, crossings, and any other condition or situation that would jeopardize operations, people, or property, appropriate warning signs or signals that shall be posted or installed. Signs must be clearly visible and maintained in a legible condition. Signals must be maintained to be operable at all times. Signs may be fixed and installed at proper clearances from the track or may be portable and temporary. Signs must be standard "blue" signs or metal flags unless otherwise prescribed. Signs shall be removed when no longer required. Typical signs are STOP, DERAIL, STOP—TANK CAR CONNECTED, and DANGER—MEN WORKING.

6-8. Clearance Markings for Crossings, Turnouts, and Ladder Tracks.

Clearance markers shall be painted on rails of adjacent tracks where the minimum clearance is reduced. Chrome yellow paint shall be used. The marker shall be 12 inches long, painted on both sides of each rail at the clearance point. Figure 3-64 (para 3-31.13.) shows typical clearance markers. In paved areas, a 12- by 24-inch yellow marker shall be painted between the tracks at the clearance point.

6-9. Whistle and/or Ring (Bell) Signs.

These signs are usually shop fabricated (Figure 6-3). Whistle and ring signs are placed at the distances from the crossings as specified in applicable state or municipal requirements, or where no such requirements exist, the AREA Standards.

Figure 6–3. Whistle sign.